

Payloads

Logistics & Hardware Transfer

Prime:

Backup:

Overview

More than 3,000 pounds of hardware and supplies will accompany the Space Shuttle Atlantis when it begins its journey to the International Space Station to make final preparations for the planned addition of Russia's Service Module Zvezda this summer.



Atlantis will carry the tonnage in its mid-deck lockers and cargo bay. In addition, biotechnology and microgravity experiments will be housed in the crew compartment and the cargo bay's Space Experiment Module (SEM). The shuttle is expected to dock to the ISS on Flight Day 3 or 4, depending on the day of launch.

Mission Specialists will be preparing to move some 3,000 pounds of equipment and supplies from the shuttle into the ISS. One of the first tasks will be to test ISS air quality and to improve air circulation with the installation of new filters in the Zarya module before addressing power system issues in the Russian component.



First logistics mission astronauts Julie Payette (left) and Ellen Ochoa transfer supplies from shuttle Discovery to ISS.

The astronauts will open the hatch to the ISS on Flight Day 5 or 6 and will begin to collect air quality samples in Unity and Zarya for comparison with a sample from Atlantis. They also will measure air-circulation velocity and monitor carbon dioxide levels. Upon completion of those tasks, the crew members will break out their tools and rework some of the air ducts in Zarya to improve airflow. They will re-route some ducts, strengthen others, add new acoustic mufflers where required, and they'll swap out the contaminant filter in Zarya and the charcoal filter in Unity.

Once they determine that there has been a sufficient improvement in air circulation, the crew members will turn their attention to maintenance issues and cargo transfers.

Battery Change-Out

Problems with performance of at least one of Zarya's six "800A" storage batteries last summer during routine, ground-commanded battery maintenance led to a decision in August to take the battery off line from the ISS power system. The batteries collect energy during the daytime portion of the Station's orbit and provide power at night.

Battery current converter, left, and 800 A-1 battery with which the crew will replace failed units on Zarya during STS-101/2A.2a.

Battery No. 1 was tested a number of times during the following weeks and, in September, was removed from service with no plans for its attempted re-use. The Station can run on as few as three of the batteries with no significant impact on operations.

Battery No. 2 failed to discharge properly following routine maintenance in mid-November. It was taken off line and subsequently found to have failed altogether due to a problem with a voltage current regulator, which operates the charging and discharging function of the unit. Battery No. 1 was brought back on line in early December and operated normally at first. But after a week and a half, it once again began to discharge improperly and its use was discontinued except during short periods when necessary. In early March, it was discharged and taken off line for good until Atlantis' flight.

A problem that occurred in March during cycling of battery No. 3 led mission controllers in Moscow to disconnect the unit. They subsequently reconnected it and it appears to be operating normally, but the problem may have damaged it. Battery No. 5 is operational but is showing signs of degradation. Batteries 4 and 6 continue to operate normally.

Atlantis' crew will replace the four suspect, 163-pound batteries -Nos. 1, 2, 3 and 5 - as well as three of their 34-pound current converters and two of their 10-pound current converter controllers.



Komparus cables will provide additional control capabilities in Zarya.

The crew will complete the day's repair and replacement chores with the replacement in Zarya of one of the four Radio Telemetry System memory units, which has exceeded its design life. They will also install new "Komparus" command system cable inserts. The inserts enhance the capability of Zarya's computer to control the ISS command and measurement system flight equipment.

Other Maintenance Items

Three fire extinguishers in Zarya have reached the end of their design life. The crew will replace them, as well as 10 smoke detectors and four cooling fans. In Unity, they will replace the Radio Frequency Power Distribution Box implicated in the loss of a return link for the Early S-Band Communications System.



New fire extinguishers for Russian control module Zarya will replace three that are approaching the end of their service lives.

Cargo Transfer

The transfer of equipment and supplies between the shuttle and station will be managed by Weber and Williams. They will initiate the transfer process on Flight Day 5 or 6 and will continue through Flight Day 8 or 9.

As was the case with the first logistics flight last May, some of the cargo will be stowed aboard the ISS for use on future missions through STS-97/4A.

Among the supplies and equipment will be devices to remove humidity from the atmosphere, a cycle ergometer for the first Expedition, or resident, crew, four portable fan assemblies for STS-92/3A, and the Pressurized Mating Adapter (PMA)-3 duct extension kit for STS-97/4A.



Pressurized Mating Adapter (PMA)-3 before completion

Some of the cargo to be transferred will consist of everyday household items such as trash bags, can openers, sewing kits, bungee cords, note pads, tools and two dictionaries in both English-to-Russian and Russian-to-English language. Other items include:

US Hardware Transfer

- ISS crew health-care system elements
- Intra-vehicular activity seal kits
- Early space communications hardware
- IMAX camera
- Space walk equipment
- Printer and accessories
- Zarya enclosures (space-saving storage units)
- Treadmill assembly; resistance exercise system
- Common Berthing Mechanism Centerline Camera

Russian Hardware Transfer

- 800A Batteries
- Battery electronics
- Strela space-crane parts
- Radio telemetry unit

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